Stable N-acetylated analogs of Sialic Acids and Sialosides

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ABSTRACT

Researchers at the University of California, Davis have constructed a library of glycans containing N-acetyl sialic acids to mimic those containing naturally occurring O-acetyl sialic acids.

FULL DESCRIPTION

O-Acetyl modifications of sialic acids affect the key roles that sialic acids play in biological and pathological processes including immunology, oncology, virology, and neuroscience. However, these modifications are unstable and can be hydrolyzed easily by pH changes or the presence of esterases. This lability of sialic acid O-acetylation has hindered its functional study and application.

Researchers at the University of California, Davis have developed an efficient method to construct a library of glycans containing sialic acids with one or more N-acetyl groups as mimics of those containing the natural occurring O-acetyl sialic acids. Glycans containing azido derivatives of legionaminic acid and sialic acids have also been produced. Molecular dynamic simulations proved that the glycans containing N-acetyl sialic acids have comparable conformation and flexibility to those containing O-acetyl sialic acids. Due to this similarity, sialic acids with N-acetylation can both be recognized and taken up by cells while also being more resistant to hydrolysis. These N-acetyl analogs provide a more viable reagent for biological evaluation and application of naturally occurring sialic acids and sialosides. These analogs can also be used to generate monoclonal antibodies in therapeutic applications and for detecting antibodies in patient sera as markers for cancerous or non-cancerous diseases and for bacterial infection.

APPLICATIONS

- Stable analogs for studying cell biology and pathology of sialosides, especially those containing labile O-acetyl modifications
- Studying the function and importance of sialoside modifications

FEATURES/BENEFITS

- Stable/viable analogs
- Mimic naturally occurring O-acetyl sialic acids
- Similar comparable conformation and flexibility as O-acetyl groups.
- Increased resistance to hydrolysis

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	12,162,901	12/10/2024	2017-287
United States Of America	Issued Patent	11,161,868	11/02/2021	2017-287

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OTHER INFORMATION

KEYWORDS

sialic acid, N-acetyl analog, O-acetyl sialic acid, carbohydrate, chemoenzymatic synthesis, legionaminic acid, sialosides

CATEGORIZED AS

- **Materials & Chemicals**
  - Biological
  - Chemicals
  - Other
- **Research Tools**
  - Antibodies
  - Nucleic Acids/DNA/RNA
  - Other

RELATED CASES

2017-287-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Purification of Glycosphingosines and Glycosphingolipids
- A Photobacterium Sp. Alpha2-6-Sialytransferase 9Psp2.6St) A366g Mutant With Increased Expression Level And Improved Activity In Sialylating Tn Antigen
- Synthesis of Capsular Polysaccharides
- Legionaminic Acid Glycosyltransferases for Chemoenzymatic Synthesis of Glycans and Glycoconjugates
- Using Escherichia coli to Produce Human Milk Oligosaccharide Lactodifucotetraose
- 4-N-Derivatized Sialic Acids and Related Sialosides
- Substrate And Process Engineering For Biocatalytic Synthesis And Facile Purification Of Human Milk Oligosaccharides (HMOs)
- O-Acetyl Glycosphingosines and Gangliosides, as well as Their N-Acetyl Analogs
- Alpha2-6-Linkage-Specific Sialidase Mutants
- Alpha1–2-Fucosyltransferase for Enzymatic Synthesis of Alpha1–2-linked Fucosylated Glycans
- Engineering Pasteurella Multocida Heparosan Synthase 2 (Pmhs2) For Efficient Synthesis Of Heparosan Heparin And Heparan Sulfate Oligosaccharides
- One-Pot Multienzyme Synthesis of Sialidase Reagents, Probes and Inhibitors
- Lacto-N-tetraose Biosynthesis from Lactose via Metabolically Rewired Escherichia Coli
- Novel Methods For Chemical Synthesis Of Lactosyl Sphingosines, Glucosylsphingosines, Galactosylsphingosines, And 3-O-Sulfogalactosylsphingosines

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